Regency® COMMUNICATIONS INC.

SERVICE MANUAL

VHF FM TRANSCEIVER
LOW BAND

MODEL MCL 60

1227 S. PATRICK DR.
SATELLITE BEACH, FLA.

0300-4154-700

PRINTED IN USA
3-80

SERVICE INFORMATION FOR MCL 60

1. Test Procedure - TP-14-214
2. PA Board Parts Overlay Showing Circuitry
3. Control Panel Parts Overlay Showing Circuitry
4. Main Board Parts Placement Diagram
5. Main Board Parts Overlay Showing Circuitry
6. Radio Schematic - 704-039
7. Parts List

APPLICATION	
NEXT ASSY	USED ON
	MCL 60

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
A	R135	9/12/79	RKE
B	EN AB007	1/9/80	RKE

REV B
SH 1
TP14-214
DWG. NO.

FINAL TEST PROCEDURE MICRO-COM L 60 SERIES

A. Transmitter Alignment

I. Test Set-Up

A. Equipment

1. MICRO-COM L 60 Transceiver
2. HP 410 DC VTVM
3. DC Power Supply with Ammeter 13.6 VDC 15 Amps DC
4. VOM Simpson 360 (Digital)
5. AC VTVM
6. Audio Oscillator
7. Mic matching network
8. 25-60 MHZ Thruline Wattmeter, 30 db Power Pad
9. Spectrum Analyzer
10. Deviation Meter*
11. Frequency Counter*
12. Small Blade Tuning Tool and Hex Tuning Tool
13. Tune-Up Crystal
14. Band Reject Filter
15. PTT Switch

*Can be replaced with Cushman or similar equipment

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES ARE	APPROVALS	DATE
FRACT. ± DEC .XX± .XXX± ANG. ±	DRAWN GM	9/12/79
	CHECKED	
	DFTG. SUPV.	
MATERIAL	ENGR. RKE	9/12/79
FINISH		
DO NOT SCALE DRWG.		

Regency® COMMUNICATIONS INC.
SATELLITE BEACH, FLORIDA 32937

TEST PROCEDURE MICRO-COM L 60

SIZE	PART NUMBER	REV.
A	TP14-214	B

SCALE

B. Test Interconnection Diagram

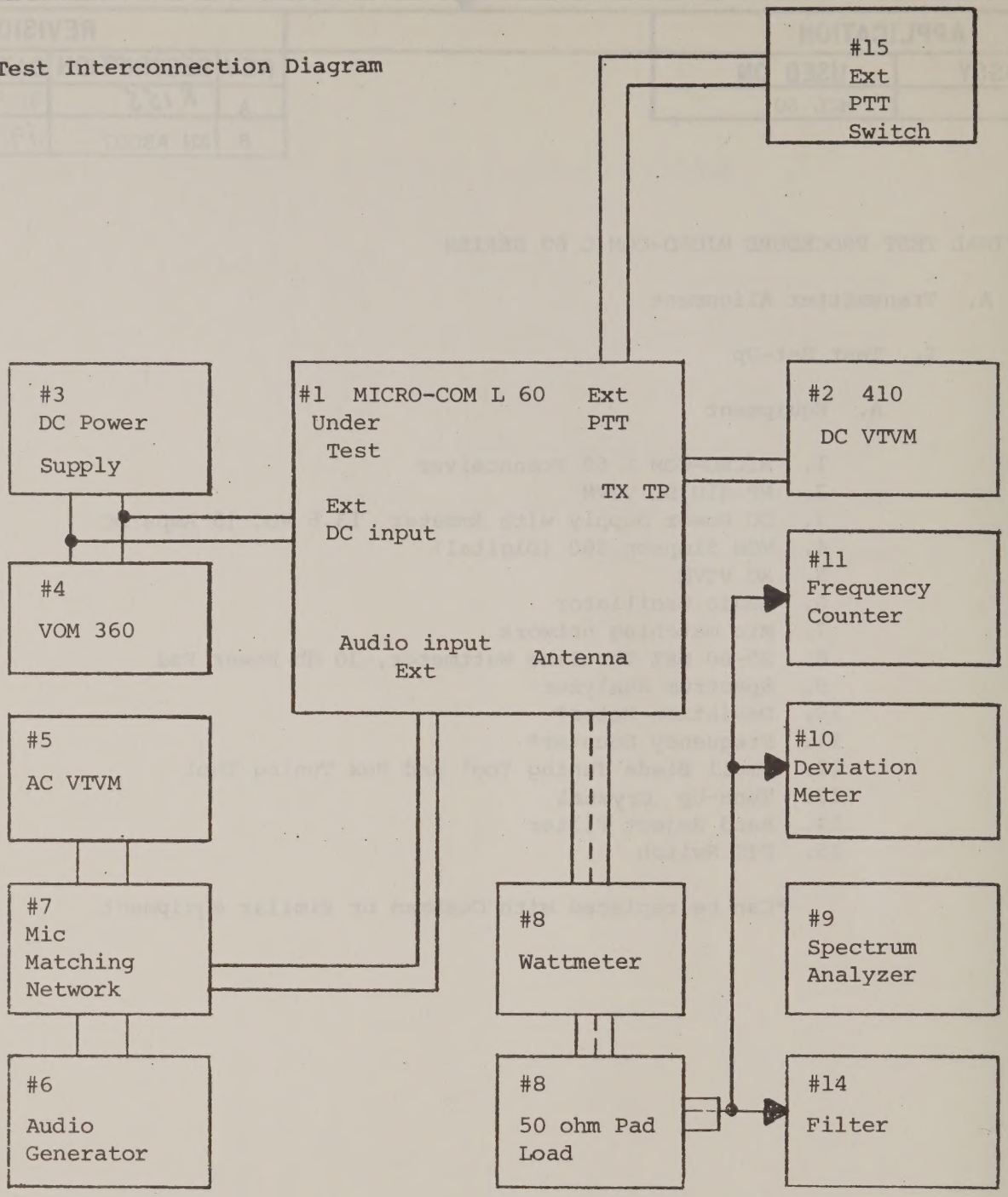
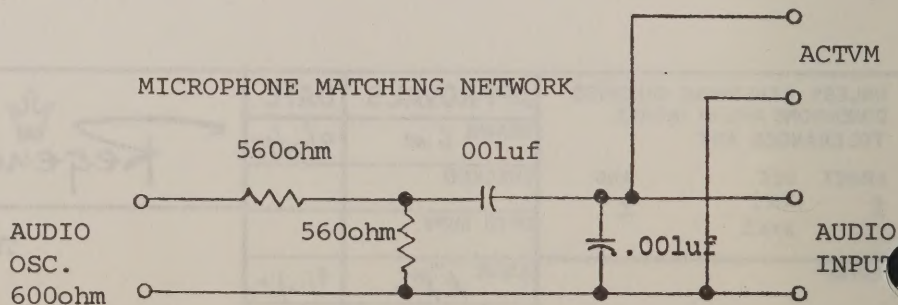


FIGURE I



DRAWN	DATE	SIZE	PART NUMBER	REV.
APPROVED RKG	DATE 11/2/79	A	TP14-214	B
DO NOT SCALE DWG.		SCALE		SHEET 2

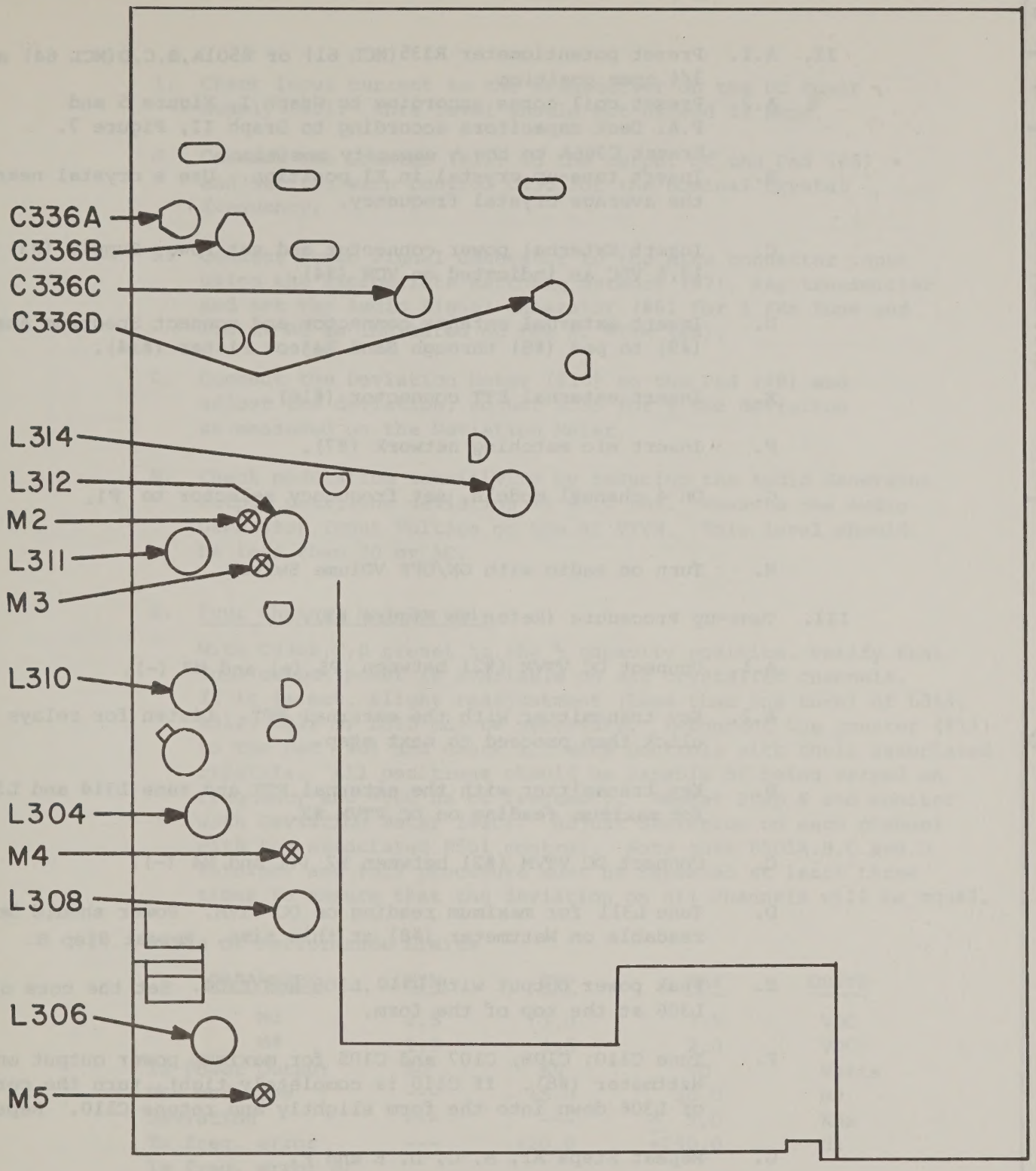


FIGURE 2

TRANSMITTER BOARD TUNING POINTS

DRAWN DJB	DATE	SIZE A	PART NUMBER TP 14-214		REV. B
APPROVED RLE	DATE 6/14/79				
DO NOT SCALE DWG.		SCALE ———			SHEET 3

II. A.1. Preset potentiometer R335(MCL 61) or R501A,B,C,D(MCL 64) at 3/4 open position.

A.2. Preset coil cores according to Graph I, Figure 5 and P.A. Deck capacitors according to Graph II, Figure 7. Preset C366A to the ½ capacity position.

B. Insert tune-up crystal in F1 position. Use a crystal nearest the average crystal frequency.

C. Insert External power connector and set Power Supply (#3) to 13.6 VDC as indicated on VOM (#4).

D. Insert external antenna connector and connect Spectrum Analyzer (#9) to pad (#8) through Band Reject Filter (#14).

E. Insert external PTT connector (#16).

F. Insert mic matching network (#7).

G. On 4 channel models, set frequency selector to F1.

H. Turn on radio with ON/OFF VOlume Switch.

III. Tune-up Procedure (Refer to Figure #2).

A.1. Connect DC VTVM (#2) between P5 (+) and M3 (-).

A.2. Key transmitter with the external PTT. Listen for relays to click then proceed to next step.

B. Key transmitter with the external PTT and tune L314 and L312 for maximum reading on DC VTVM #2.

C. Connect DC VTVM (#2) between P2 (+) and M4 (-).

D. Tune L311 for maximum reading on DC VTVM. Power should be readable on Wattmeter (#8) at this time. Repeat Step B.

E. Peak power output with L310,L308 and L304. Set the core of L306 at the top of the form.

F. Tune C110, C108, C107 and C105 for maximum power output on Wattmeter (#8). If C110 is completely tight, turn the core of L306 down into the form slightly and retune C110. Repeat.

G. Repeat Steps A1, B, C, D, E and F.

H. Set the Spectrum Analyzer (#9) and Band Reject Filter (#14) for maximum carrier indication on the 0 db reference line. Attenuate the carrier with the Band Reject Filter (#14) a minimum of 30 db. Check for 2nd harmonic level on the Spectrum Analyzer. The second harmonic should be greater than 61 db down.

I. Check input current to the transceiver on the DC Power Supply (#3). This level should not exceed 12 amps.

J. Connect the Counter (#11) to the output of the Pad (#8) and set the warp control C335 for the nominal crystal frequency.

K. Connect Audio Signal Generator to the mike connector input using the appropriate matching network (#7), key transmitter and set the Audio Signal Generator (#6) for 1 KHz tone and 150 mv AC as indicated on the AC VTVM (#5).

L. Connect the Deviation Meter (#10) to the Pad (#8) and adjust the deviation, adjust R335 for ± KHz deviation as measured on the Deviation Meter.

M. Check modulation sensitivity by reducing the Audio Generator Output until the deviation is ±3.0 KHz. Measure the Audio Generator Input Voltage on the AC VTVM. This level should be less than 20 mv AC.

N. Four Channel Models Only

With C336B,C,D preset to the ½ capacity position, verify that full output power is available on all crystalled channels. If it is not, slight readjustment (less than one turn) of L314, L312, L311 or L310 may be necessary. Reconnect the counter (#11) to the pad (#8) and check all warp controls with their associated crystals. All positions should be capable of being warped on frequency and ±500 Hz of frequency. Repeat Step K and monitor with Deviation Meter (#10). Adjust deviation on each channel with the associated R501 control. Note that R501A,B,C and D interact and this procedure must be repeated at least three times to assure that the deviation on all channels will be equal.

IV. Table of Performance Limits

PARAMETER	MIN	TYP	MAX	UNITS
M3	2.5	3.0	3.5	VDC
M4	1.0	1.5	2.0	VDC
Tx Power Output	60	65	90	Watts
Mic mod sens	---	15.0	20.0	mv
Deviation	---	---	± 5.0	KHz
Tx freq. error	---	±20.0	±250.0	Hz
Tx freq. error W/ ±5 KHz Dev.	---	---	500	Hz

B. Receiver Alignment

I. Test Set-Up

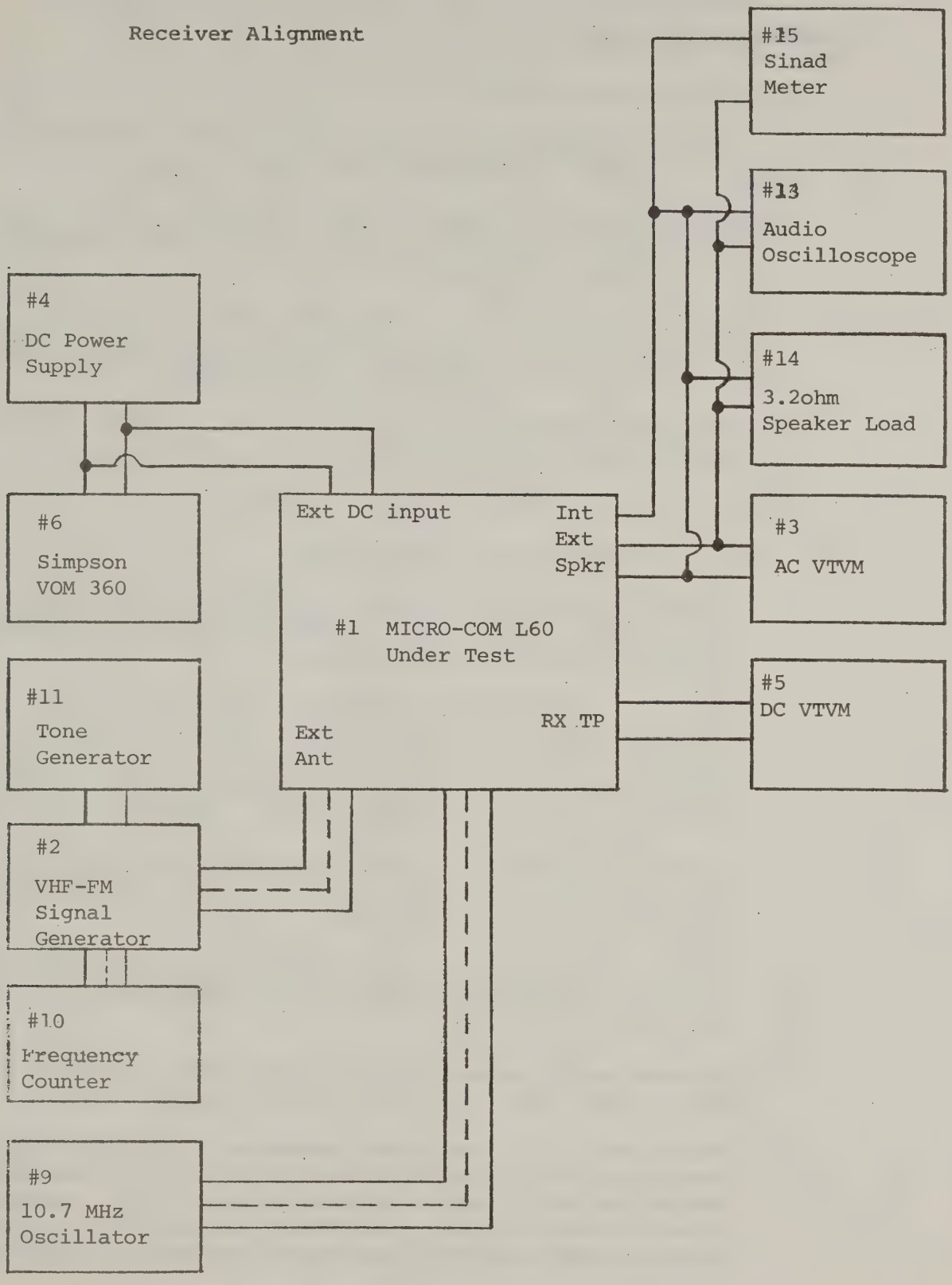
A. Equipment

1. MICRO-COM L60 Transceiver
2. VHF-FM Signal Generator*
3. AC VTVM
4. DC Power Supply
5. DC VTVM or VOM
6. VOM - Simpson 360 (Digital)
7. Hex Tuning Tool
8. Small Blade Tuning Tool
9. 10.7 MHz Oscillator
10. Frequency Counter*
11. Sub-Audible Tone Generator
12. Tune-Up Crystal
13. Audio Oscilloscope
14. 3.2 ohm Speaker Load
15. Sinad Meter or Distortion Meter with 1000 Hz Band Elimination Filter

*Can be replaced with Cushman or similar equipment

B. Test Interconnection Diagram

Receiver Alignment



DRAWN	DATE	SIZE	PART NUMBER	REV.
APPROVED RKE	DATE 9/12/79	A	TP14-214	B
DO NOT SCALE DWG.		SCALE		SHEET 7

II. Preset Conditions

A. Set DC Input Voltage at 13.8 VDC as measured on #6 DC VOM.

B. Insert tune-up crystal. Tune-up on crystal nearest the center of the receive frequencies to be used.

C. Set VHF-FM Signal Generator #2 to tune-up crystal frequency measured on the Frequency Counter #10 and output attenuator to -130 dbm (zero output).

D. 1. Set squelch control (R402) fully CW.
2. On tone units, set tone monitor switch to monitor position, or underground microphone hangup button.

E. Set ON-OFF Volume Control (R403 to Off) fully CCW. In 4 channel models, set Channel Selector to tune-up channel.

F. Preset coil cores per Graph II, Figure 6.

III. Tune-Up Procedure (Refer To Figure #1)

A. Connect AC VTVM (#3) across the speaker load and adjust the ON-OFF Volume Control for a readable output level on the audio output AC VTVM #3 on the 1V scale.

B. Connect DC VTVM (#5) between Aø and ground; and adjust L209 (detector coil) for a 3.4 VDC on DC VTVM(#5) by feeding a strong 10.7 MHz signal into the area of L311 as indicated on the receiver tuning chart. Aø voltage should measure 3.4 VDC as indicated on the DC VTVM meter #5. Remove 10.7 MHz signal.

C. Increase the output of signal generator #2 set for 2 KHz tone and 3 KHz deviation. Observe meter #16 and increase signal generator output for 6 db sinad.

D. Adjust L204, L203, L202, L205 and L211 for best 12 db sinad. Constantly reduce signal generator #2 output for 12 db sinad on meter #16.

E. Increase signal generator #2 to 1000µv and turn volume control R403 to full level. AC VTVM #3 should exceed 3.6V AC.

F. Remove modulation from signal generator #2 and set it to -130 dbm signal level. Set AC VTVM #3 to 1V scale and use volume control to set voltage on AC VTVM #3 to 1.0V AC. Increase signal generator #2 until AC VTVM #3 reads 0.1V AC. This 20 db quieting level should be less than 0.5µv and typically 0.4µv.

G. Reduce the output of signal generator #2 to -130 dbm and set squelch control R402 to threshold just quieting receiver noise. Increase signal generator level #2 until noise appears. This is threshold squelch level and should be less than 0.3µv.

H. Turn the squelch control R402 fully counter-clockwise and increase the signal generator level until squelch opens again. This is tight squelch and should be less than 1.0μv.

IV. Table of Performance Limits

PARAMETER	MIN	TYP	MAX	UNITS
Aø	3.2	3.4	3.6	VDC
12 db Sinad		0.25	0.35	μv
20 dbQ	---	0.35	0.5	μv
Threshold Squelch	---	0.20	0.30	μv
Tight Squelch	0.4	0.5	1.0	μv
Audio Output 1 KHz Tone 3 KHz Dev.	3.6	4.0	---	VAC
Noise Output	2.5	3.0	---	VAC

C. Specifications and other data pertinent to MICRO-COM L 60

I. Specifications

a. Drawing #304-111
b. Drawing #304-110
c. Drawing #304-109

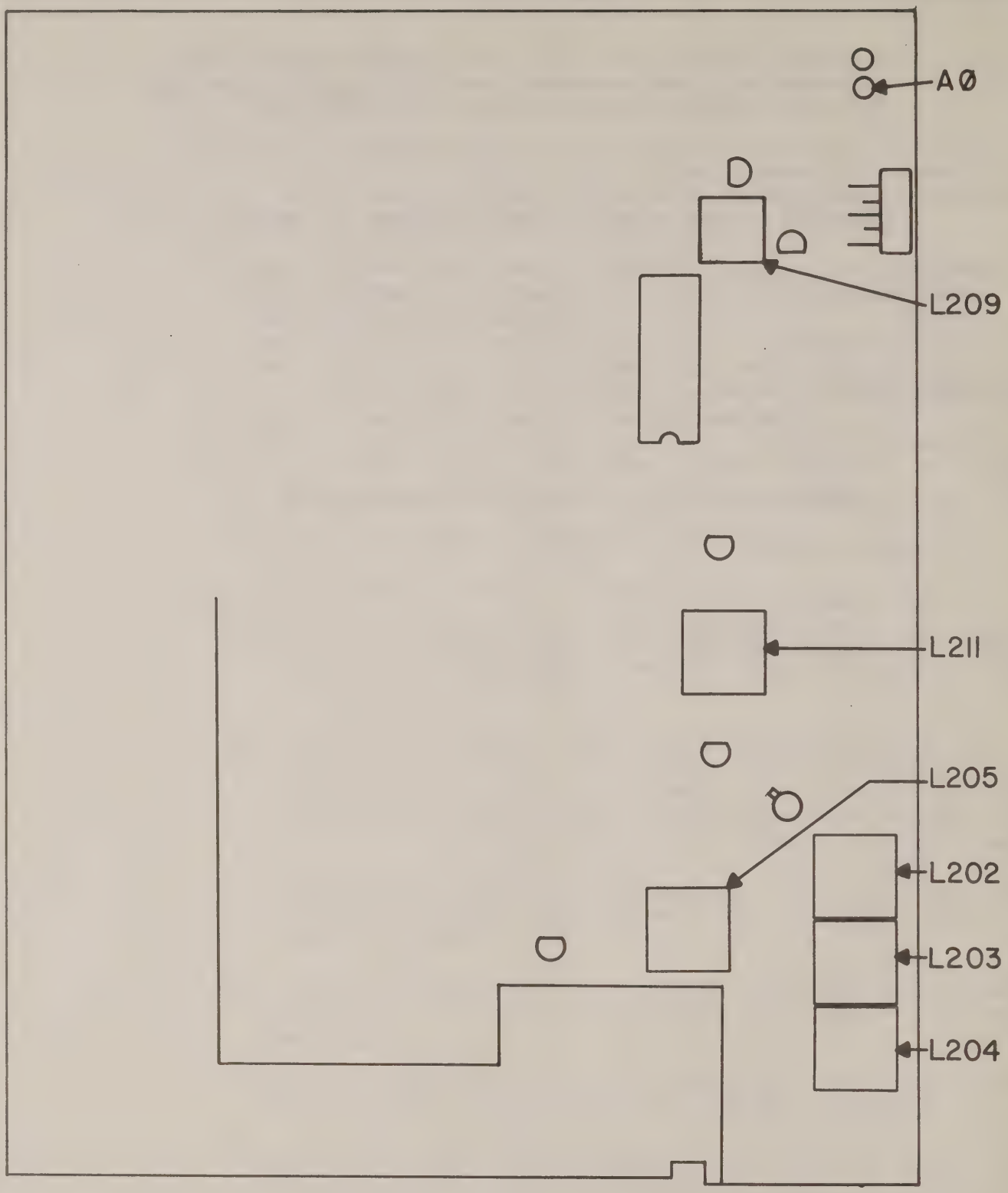


FIGURE 4

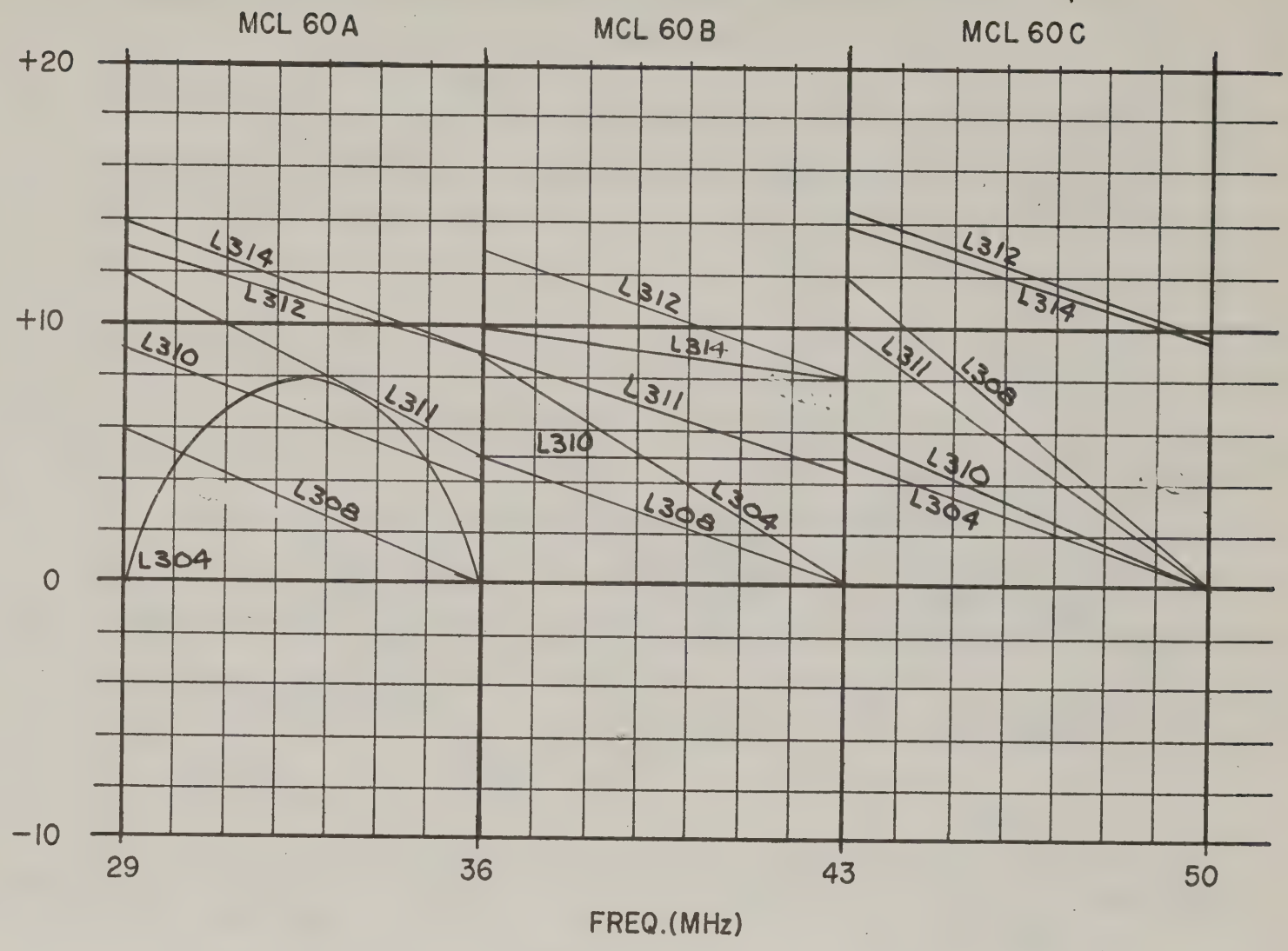
RECEIVER TUNING POINTS

DRAWN DJB	DATE	SIZE A	PART NUMBER TP 14-214	REV. B
APPROVED	DATE 5/4/79			
DO NOT SCALE DWG.		SCALE		SHEET 10

DWG. NO. TP 14-214 | SH. 10 | REV. B

DRAWN CMcC	DATE 9-79	SIZE A	PART NUMBER TP 14-214
APPROVED	DATE 9/12/79	SCALE ~	REV. B
DO NOT SCALE DWG.			SHEET 11

CW TURNS FROM TOP OF FORM

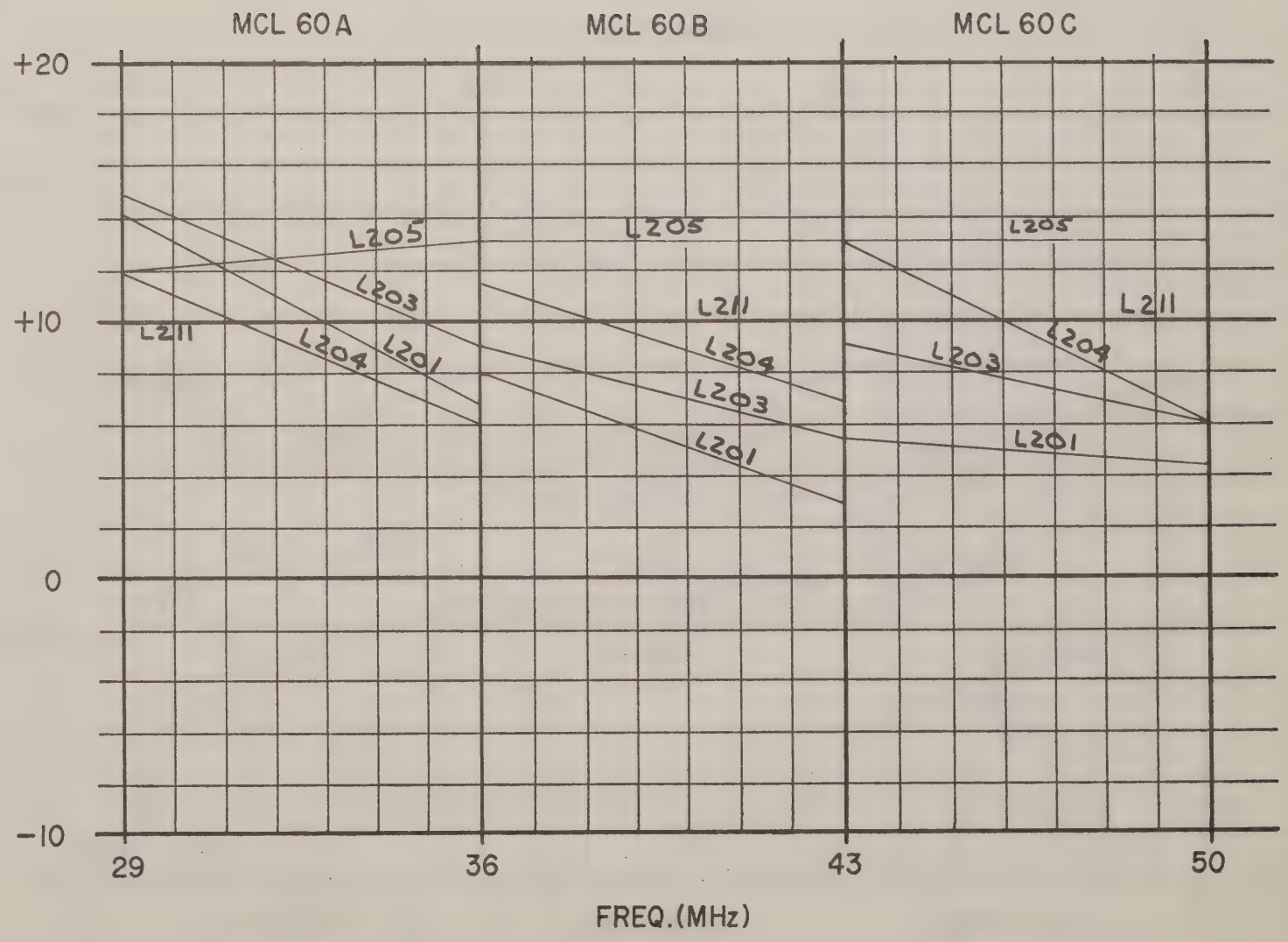


GRAPH I FIGURE 5

TX COIL PRESETS

DRAWN CMCC	DATE 9-79	SIZE A	REV. B
APPROVED	DATE 9/11/79	SCALE ~	PART NUMBER TP 14-214
DO NOT SCALE DWG.			SHEET 12

CW TURNS FROM TOP OF FORM



GRAPH II FIGURE 6

RX COIL PRESETS

DRAWN C M c C

APPROVED

DATE 9-79

DATE 5/12/79

SIZE A

SCALE ~

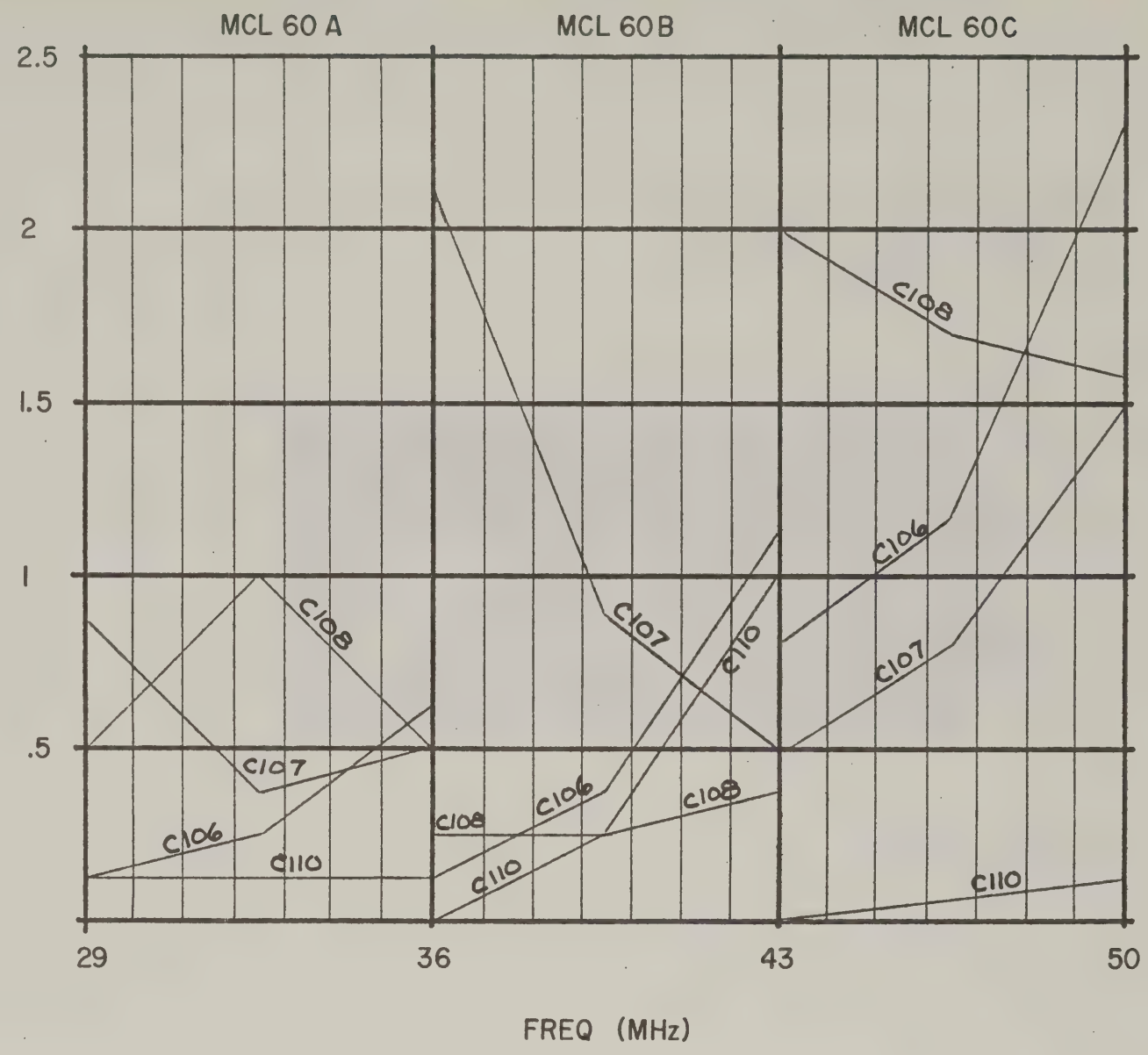
PART NUMBER TP 14214

REV. B

SHEET 13

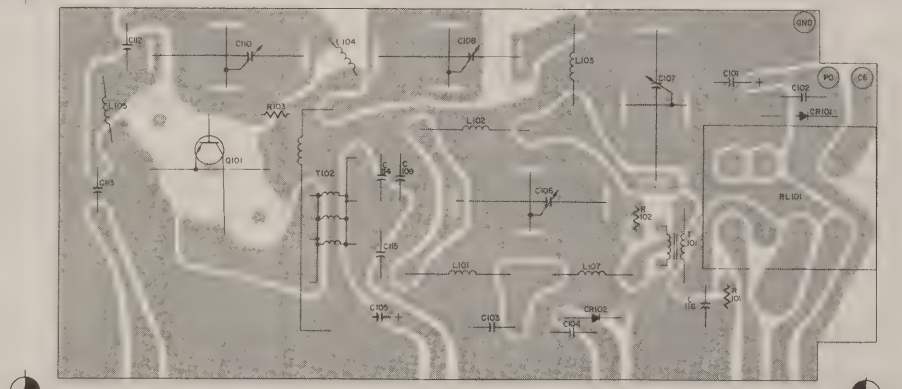
DO NOT SCALE DWG.

Capacitor turns from tight



GRAPH II FIGURE 7
PA DECK CAPACITOR PRESETS

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED
	A	RELEASE R-157		



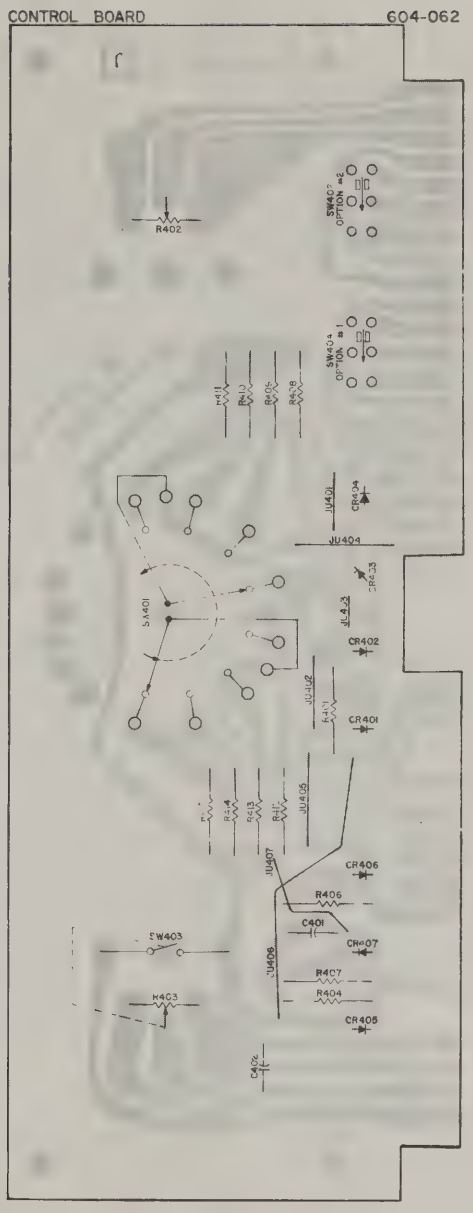
		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE FRACT DEC ANG X .XX ± ASSY	APPROVALS	DATE
		MATERIAL —	DRAWN	
		FINISH —	CHECKED	
	MCL-60		QA/E Supv.	
NEXT ASSY	USED ON		ENGR	12-5 4/1/76
APPLICATION		DO NOT SCALE DWG.	MFG	

COMMUNICATIONS INC
SATELLITE BEACH, FLORIDA 32937

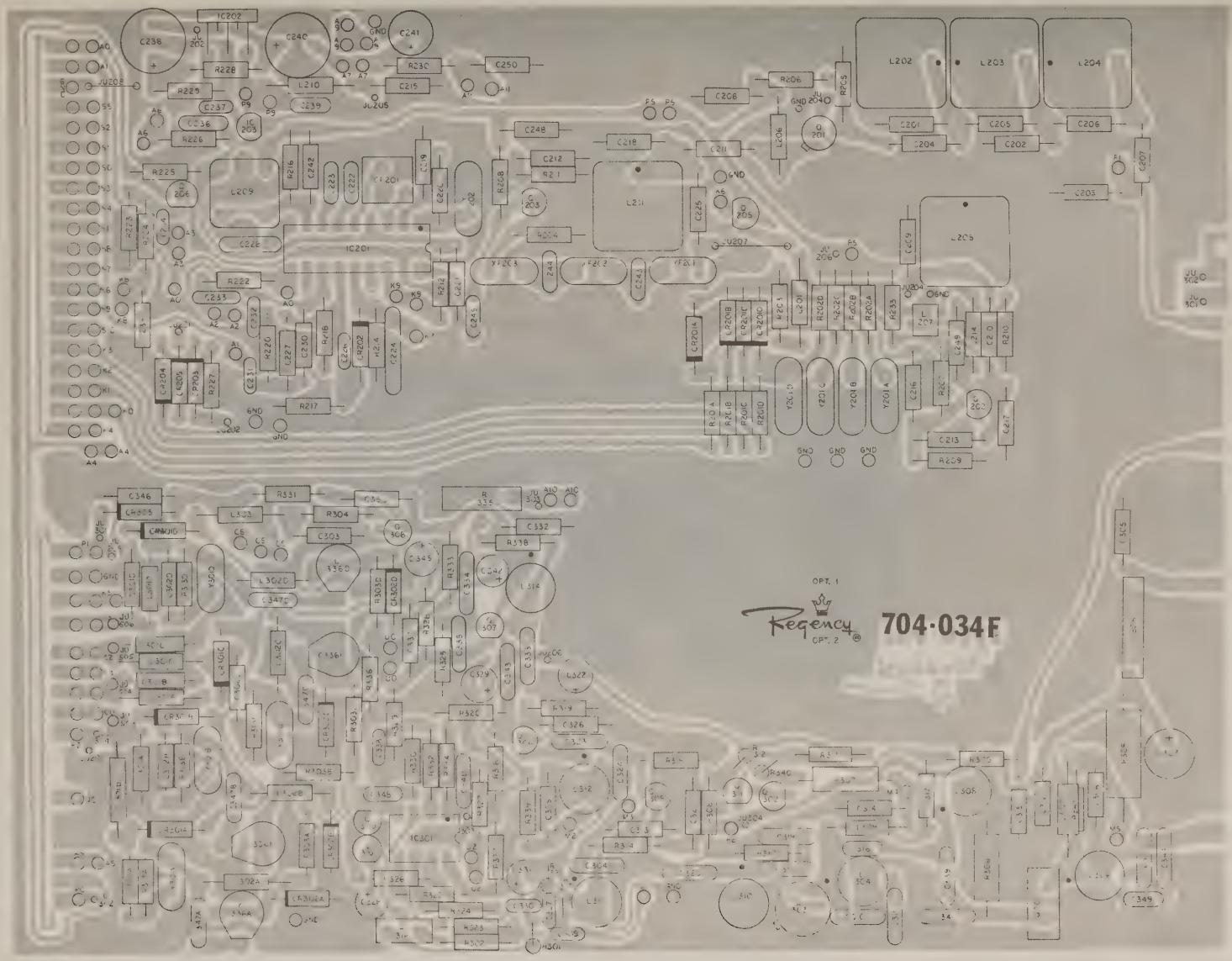
PARTS OVERLAY
MCL-60 P.A BOARD

SIZE C | PART NUMBER 504-293 | REV A

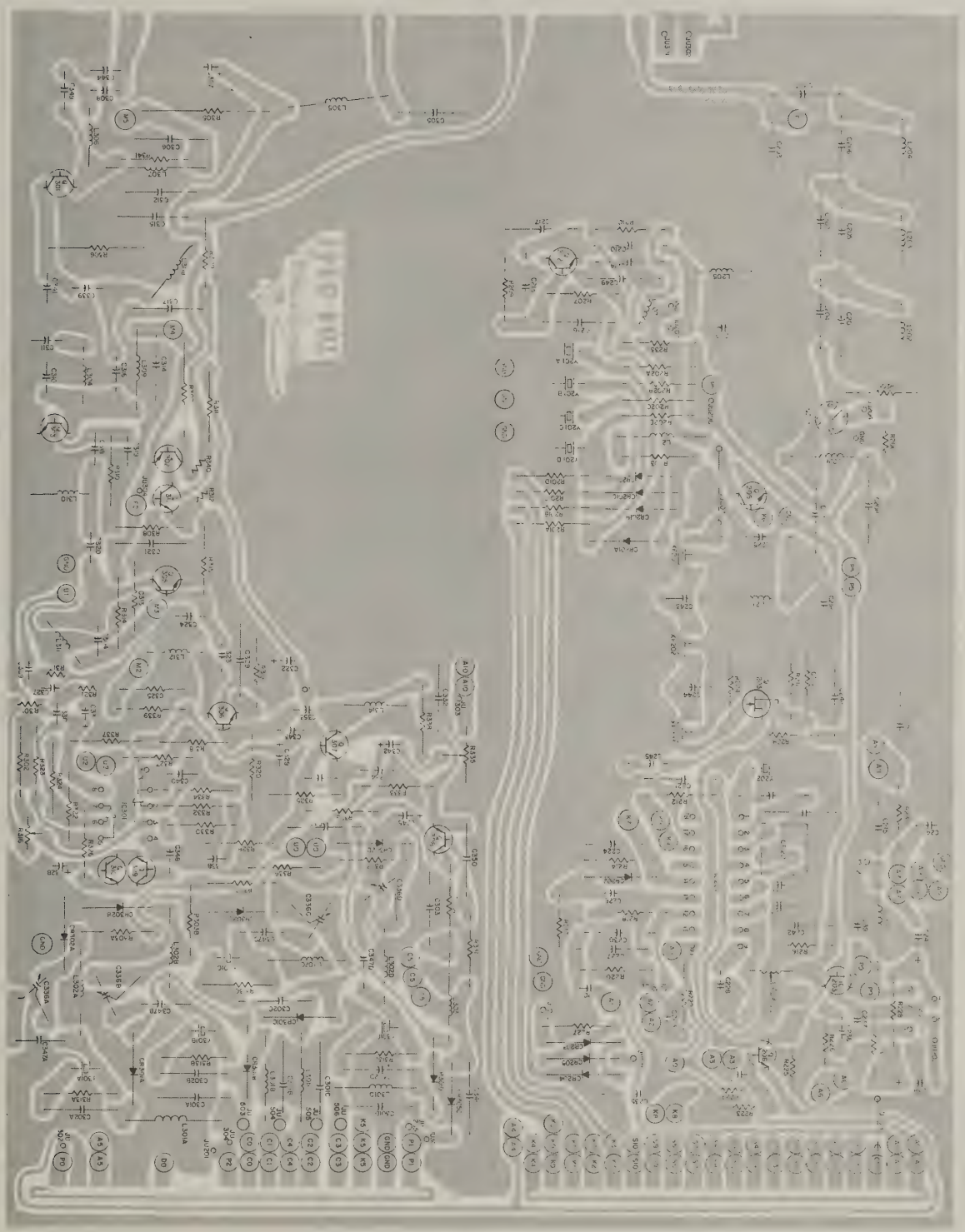
SCALE 4/1 | SHEET 1 OF 1

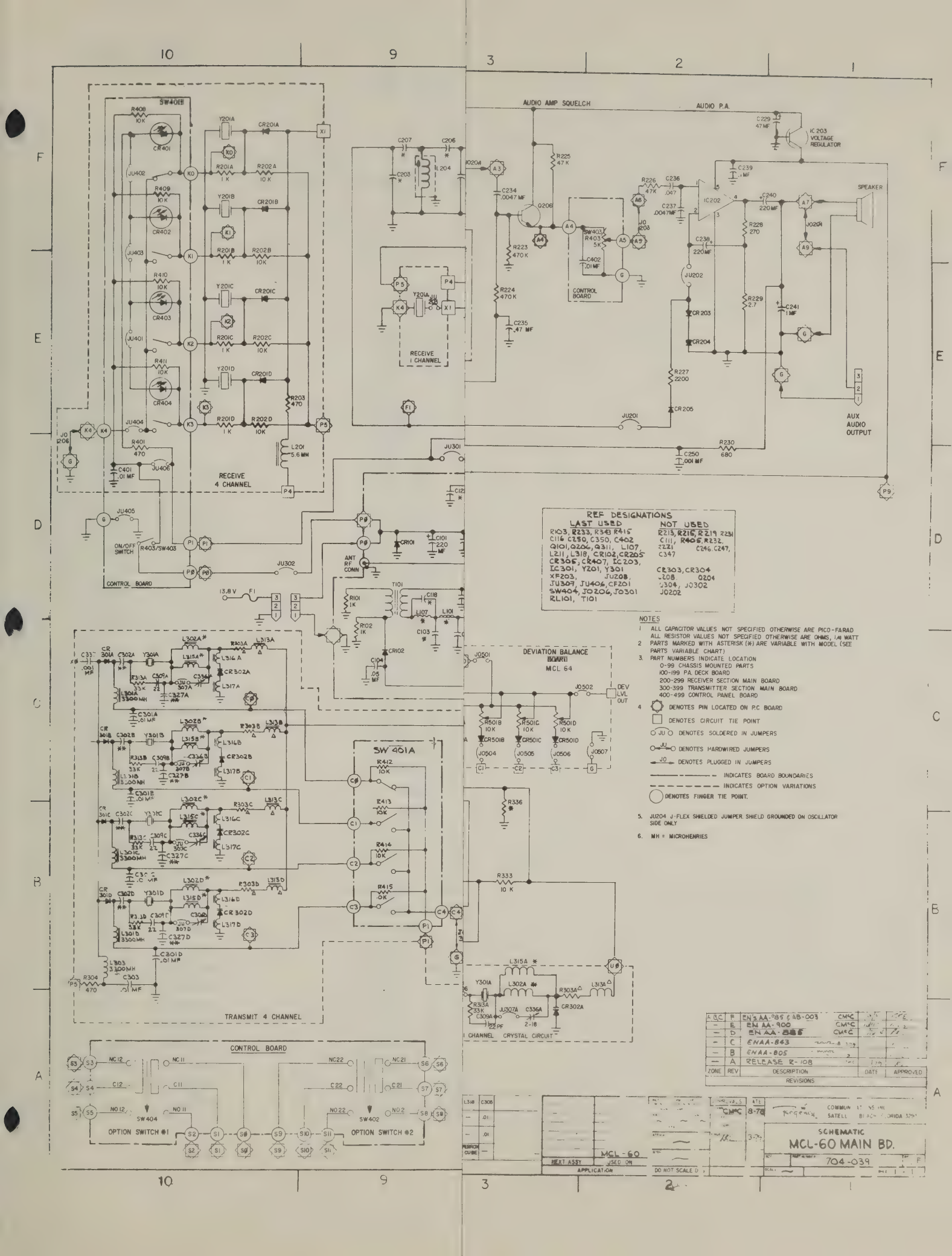


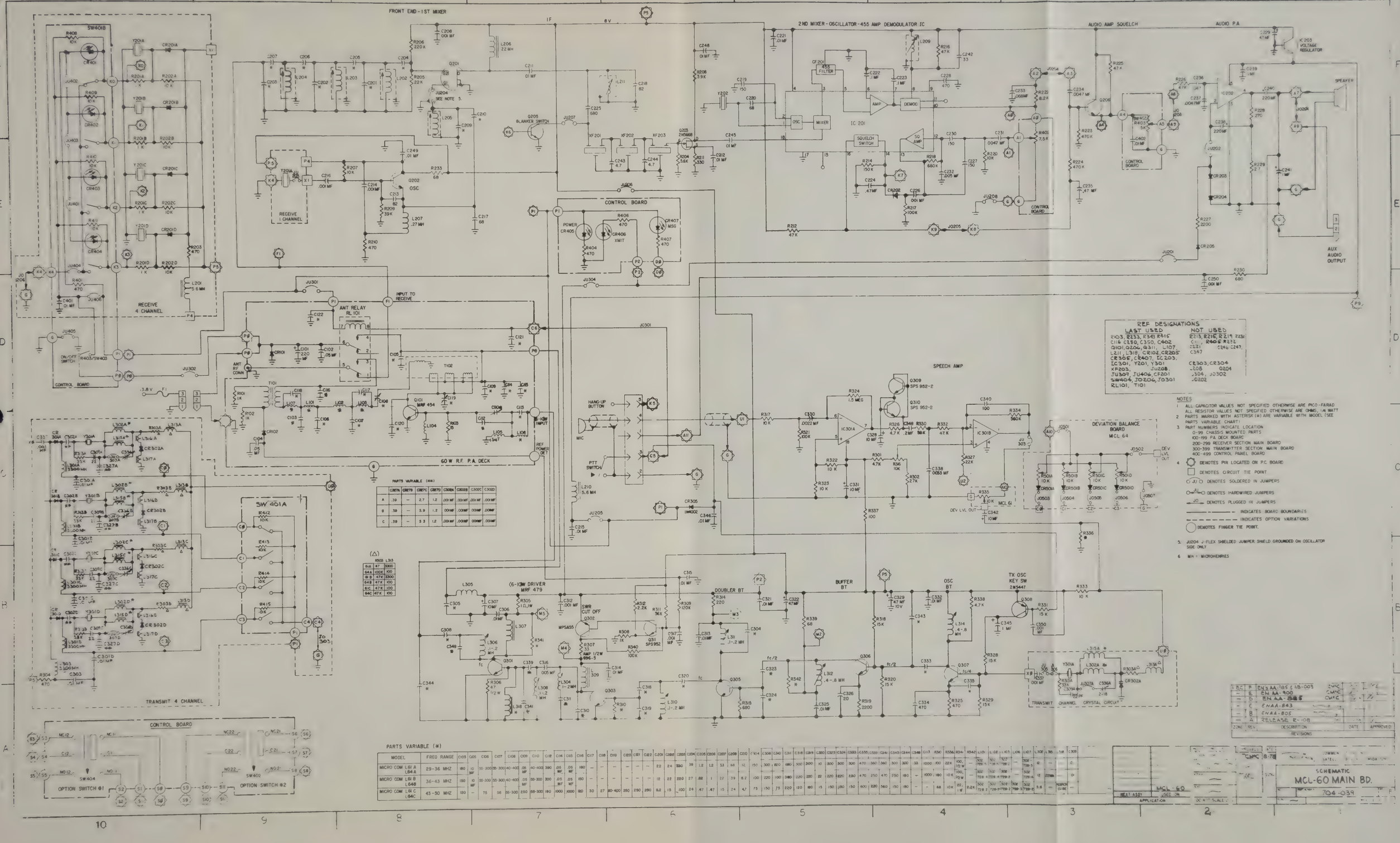
PARTS OVERLAY, CONTROL BOARD


OPT. 1
Regency
OPT. 2
704-034F

REDUCE TO 5.250 ±.003




AUDIO AMP SQUELCH
AUDIO P.A.
IC 203 VOLTAGE REGULATOR
SPEAKER
AUX AUDIO OUTPUT
RECEIVE 4 CHANNEL
RECEIVE 1 CHANNEL
CONTROL BOARD
ON/OFF SWITCH
ANT RF CONN
DEVIATION BALANCE BOARD MCL 64
DEV LVL OUT
TRANSMIT 4 CHANNEL
1 CHANNEL CRYSTAL CIRCUIT
OPTION SWITCH #1
OPTION SWITCH #2
SW401A
SW402
SW403
SW404
REF DESIGNATIONS
LAST USED
R103, R233, R348 R415 C116 C250, C350, C402 Q101, Q206, Q311, L107, L211, L318, CR102, CR205 CR305, CR407, IC203, IC301, YZ01, Y301 XF203, JUZ08, JU307, JU406, CF201 SW404, JO206, JO301 RL101, T101
NOT USED
R213, R215, R219 R231 C111, R405, R232, R221 C246, C247, C347
CR303, CR304
Q204
J304, J0302
J0202
NOTES
1 ALL CAPACITOR VALUES NOT SPECIFIED OTHERWISE ARE PICO-FARAD ALL RESISTOR VALUES NOT SPECIFIED OTHERWISE ARE OHMS, 1/4 WATT
2 PARTS MARKED WITH ASTERISK (*) ARE VARIABLE WITH MODEL (SEE PARTS VARIABLE CHART)
3. PART NUMBERS INDICATE LOCATION
0-99 CHASSIS MOUNTED PARTS
100-199 P.A. DECK BOARD
200-299 RECEIVER SECTION MAIN BOARD
300-399 TRANSMITTER SECTION MAIN BOARD
400-499 CONTROL PANEL BOARD
4 DENOTES PIN LOCATED ON P.C. BOARD
DENOTES CIRCUIT TIE POINT
JU DENOTES SOLDERED IN JUMPERS
JU DENOTES HARDWIRED JUMPERS
JO DENOTES PLUGGED IN JUMPERS
INDICATES BOARD BOUNDARIES
INDICATES OPTION VARIATIONS
DENOTES FINGER TIE POINT.
5. JU204 J-FLEX SHIELDED JUMPER. SHIELD GROUNDED ON OSCILLATOR SIDE ONLY
6. MH = MICROHENRIES
ZONE REV DESCRIPTION DATE APPROVED
REVISIONS
SCHEMATIC
MCL-60 MAIN BD.
704-039
MCL-60
NEXT ASSY USED ON
APPLICATION
DO NOT SCALE D


FRONT END - 1ST MIXER
2ND MIXER - OSCILLATOR - 455 AMP DEMODULATOR IC
AUDIO AMP SQUELCH
AUDIO P.A.
SPEECH AMP
CONTROL BOARD
RECEIVE 4 CHANNEL
TRANSMIT 4 CHANNEL
60 W R.F. P.A. DECK
DEVIATION BALANCE BOARD MCL 64
TRANSMIT CHANNEL CRYSTAL CIRCUIT
SW401A
SW401B
SW601A
IC 201
IC 301B
K 203 VOLTAGE REGULATOR
AUX AUDIO OUTPUT
SPEAKER
HANG-UP BUTTON
MIC
PTT SWITCH
TX OSC KEY SW
BUFFER BT
OSC BT
DOUBLER BT
SWR CUT OFF
(6-10W DRIVER MRF 479
ANT RELAY RL 101
ANT RF CONN
ON/OFF SWITCH
OPTION SWITCH #1
OPTION SWITCH #2
SW404
SW402
SW403
HIGH INPUT
REF POWER DET
INPUT TO RECEIVE
OSC
MIXER
AMP
DEMOD
SQUELCH SWITCH
SQ AMP
CF201 455 FILTER
Q201 SEE NOTE 5.
Q205 BLANKER SWITCH
Q202 OSC
Q203 2N5668
Q301 MRF 454
Q302 MPSA55
Q303 MRF 479
Q309 SPS 952-2
Q310 SPS 952-2
Q311 SPS952
Q305
Q306
Q307
Q308
Y201A
Y201B
Y201C
Y201D
Y202
Y301A
Y301B
Y301C
Y301D
XF201
XF202
XF203
CR201A
CR201B
CR201C
CR201D
CR401
CR402
CR403
CR404
CR405 POWER
CR406 XMIT
CR407 MSG
CR101
CR102
CR103
CR104
CR105
CR202
CR203
CR204
CR205
CR206
CR301A
CR301B
CR301C
CR301D
CR302A
CR302B
CR302C
CR302D
CR303
CR304
CR305
CR306
CR307
CR308
CR309
CR310
CR311
CR312
CR313
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CR315
CR316
CR317
CR318
CR319
CR320
CR321
CR322
CR323
CR324
CR325
CR326
CR327
CR328
CR329
CR330
CR331
CR332
CR333
CR334
CR335
CR336
CR337
CR338
CR339
CR340
CR341
CR342

PARTS LIST

60W R.F. P.A. DECK

LOCATION	DESCRIPTION	PART NUMBER
RESISTORS	(all resistors are ¼W 5% unless otherwise specified)	
R101	1K	4704-0102-032
R102	1K	4704-0102-032
R103	15 ohm	4704-0150-032
CAPACITORS		
C101	22µf 16V 85D Elect	1513-0221-002
C102	.05µf +8-2 25V BC25 CD	1501-0503-003
C103 A Range	180pf 5% 500V DM-15 silver mica	1504-0181-505
C103 B Range	150pf 5% 500V DM-15 silver mica	1504-0151-505
C103 C Range	120pf 5% 500V DM-15 silver mica	1504-0121-505
C104	.05mf+8-2 25V BC25 CD	1501-0503-003
C105 A Range	10µf 35V Type U Elect	1513-0100-006
C105 B Range	10µf 35V Type U Elect	1513-0100-006
C105 C Range	not used	
C106 A Range	55-300pf EL427P trim mica	1517-0000-007
C106 B Range	55-300pf EL427P trim mica	1517-0000-007
C106 C Range	75pf DM-15 silver mica	1504-0750-505
C107 A Range	55-300pf EL427P trim mica	1517-0000-007
C107 B Range	55-300pf EL427P trim mica	1517-0000-007
C107 C Range	56pf 5% 500V DM15 silver mica	1504-0560-505
C108 A Range	90-400pf EL429P trim mica	1517-0000-008
C108 B Range	90-400pf EL429P trim mica	1517-0000-008
C108 C Range	55-300pf EL427P trim mica	1517-0000-007
C109 A Range	.05µf +8-2 25V BC25 CD	1501-0503-003
C109 B Range	.05µf +8-2 25V BC25 CD	1501-0503-003
C109 C Range	250pf 5% 500V silver mica	1504-0251-505
C110 A Range	90-400pf EL429P trim mica	1517-0000-008
C110 B Range	55-300pf EL427P trim mica	1517-0000-007
C110 C Range	55-300pf EL427P trim mica	1517-0000-007
C111	not used	
C112 A Range	390pf 5% 500V DM-15 silver mica	1504-0191-505
C112 B Range	300pf 5% 500V DM-15 silver mica	1504-0301-505
C112 C Range	180pf 5% 500V DM-15 silver mica	1504-0181-505
C113 A Range	1000pf 500V DM-15 silver mica	1504-0102-505
C113 B Range	1000pf 500V DM-15 silver mica	1504-0102-505
C113 C Range	not used	
C114 A Range	.05µf +8-2 25V BC25 CD	1501-0503-003
C114 B Range	.05µf +8-2 25V BC25 CD	1501-0503-003
C114 C Range	1000pf 10% mica	1522-0102-002
C115 A Range	.05µf +8-2 25V BC25 CD	1501-0503-003
C115 B Range	.05µf +8-2 25V BC25 CD	1501-0503-003
C115 C Range	1000pf 500V DM-15 silver mica	1504-0102-505
C116 A Range	180pf 5% 500V DM-15 silver mica	1504-0181-505
C116 B Range	150pf 5% 500V DM-15 silver mica	1504-0151-505
C116 C Range	27pf 5% 500V DM-15 silver mica	1504-0270-505

LOCATION	DESCRIPTION	PART NUMBER
C117 C Range	30pf 5% 500V	1504-0300-505
C118 C Range	27pf 5% 500V	1504-0270-505
C119 C Range	90-400pf EL429P trim mica	1517-0000-008
C120 C Range	250pf 5% 500V silver mica	1504-0251-505
C121 C Range	250pf 5% 500V silver mica	1504-0251-505
C122 C Range	250pf 5% 500V silver mica	1504-0251-505
DIODES		
CR101	Sil Rect IN4002	4806-0000-004
CR102	Sil IN4148	4805-1241-200
TRANSISTORS		
Q101	RF Power	4804-3170-904
RELAYS		
RL101	12V Guar A410-363734-12	4500-3251-900
TRANSFORMERS		
T101	coil assy VSWR	1800-3190-100
T102	RF out	5602-3272-900
COILS		
L101 A Range	11T	1801-3272-805
L101 B Range	9T	1801-3272-804
L101 C Range	6T	1801-3272-802
L102 A Range	11T	1801-3272-805
L102 B Range	9T	1801-3272-804
L102 C Range	6T	1801-3272-802
L103 A Range	6T	1801-3272-802
L103 B Range	6T	1801-3272-802
L103 C Range	6T	1801-3272-802
L104	coil	1800-5100-518
L105	coil	1801-3407-701
L106	not used	
L107 A Range	11T	1801-3272-805
L107 B Range	9T	1801-3272-804
L107 C Range	6T	1801-3272-802

RECEIVER BOARD

LOCATION	DESCRIPTION	PART NUMBER	
RESISTORS	(all resistors are ¼W 5% unless otherwise specified)		
R201A	1K	4704-0102-032	4 ch
R201B	1K	4704-0102-032	4 ch
R201C	1K	4704-0102-032	4 ch
R201D	1K	4704-0102-032	4 ch
R202A	10K	4704-0103-032	4 ch
R202B	10K	4704-0103-032	4 ch
R202C	10K	4704-0103-032	4 ch
R202D	10K	4704-0103-032	4 ch
R203	470 ohm	4704-0471-032	4 ch
R204	5.6K	4704-0562-032	
R205	22K	4704-0223-032	
R206	220K	4704-0224-032	
R207	10K	4704-0103-032	
R208	3.9K	4704-0392-032	
R209	39K	4704-0393-032	
R210	470 ohm	4704-0471-032	
R211	330 ohm	4704-0331-032	
R212	47K	4704-0473-032	
R213	not used		
R214	150K	4704-0154-032	
R215	not used		
R216	47K	4704-0473-032	
R217	100K	4704-0104-032	
R218	680K	4704-0684-032	
R219	not used		
R220	10K	4704-0103-032	
R221	not used		
R222	8.2K	4704-0822-032	
R223	470K	4704-0474-032	
R224	470K	4704-0474-032	
R225	47K	4704-0473-032	
R226	47K	4704-0473-032	
R227	2.2K	4704-0222-032	
R228	270 ohm	4704-0271-032	
R229	2.7 ohm	4704-0279-032	
R230	680 ohm	4704-0681-032	
R231	not used		
R233	68 ohm	4704-0680-032	

CAPACITORS			
C201	A Range	22pf tub cer	1538-0220-508
C201	B Range	12pf tub cer	1538-0120-508
C201	C Range	8.2pf 10% tub cer	1838-0829-608
C202	A Range	24pf DM-15 500V silver mica	1504-0240-505
C202	B Range	22pf tub cer	1538-0220-508
C202	C Range	15pf 5% NPO 50V tub cer	1538-0150-508

LOCATION	DESCRIPTION	PART NUMBER
C203 A Range	330pf tub cer	1538-0331-601
C203 B Range	220pf tub cer	1538-0221-601
C203 C Range	100pf 5% GP 50V tub cer	1538-0101-524
C204 A Range	39pf tub cer	1538-0390-508
C204 B Range	27pf tub cer	1538-0270-508
C204 C Range	24pf tub cer	1538-0240-508
C205 A Range	1.2pf 10% MC (MUD)	1510-0129-900
C205 B Range	.82pf 10% MC (MUD)	1510-0828-900
C205 C Range	.68pf 10% MC (MUD)	1510-0688-900
C206 A Range	1.2pf 10% MC (MUD)	1510-0129-900
C206 B Range	1pf 10% MC (MUD)	1510-0010-900
C206 C Range	.68pf 10% MC (MUD)	1510-0688-900
C207 A Range	33pf tub cer	1538-0330-508
C207 B Range	22pf tub cer	1538-0220-508
C207 C Range	15pf 5% NPO 50V tub cer	1538-0150-508
C208	.001µf 20% Y5T 50V tub cer	1538-0102-703
C209 A Range	68pf tub cer	1538-0680-524
C209 B Range	39pf tub cer	1538-0390-508
C209 C Range	24pf tub cer	1538-0240-508
C210 A Range	12pf tub cer	1538-0120-508
C210 B Range	8.2pf tub cer	1538-0829-608
C210 C Range	4.7pf 10% NPO 50V tub cer	1538-0479-608
C211	.01µf 30% Y5R 25V tub cer	1538-0103-804
C212	.01µf 30% Y5R 25V tub cer	1538-0103-804
C213	82pf 5% GP 50V tub cer	1538-0820-524
C214	.001µf 20% Y5T 50V tub cer	1538-0102-703
C215	.01µf 30% Y5R 25V tub cer	1538-0103-804
C216	.001µf 20% Y5T 50V tub cer	1538-0102-703
C217	68pf 5% GP 50V tub cer	1538-0680-524
C218	82pf 5% GP 50V tub cer	1538-0820-524
C219	150pf 10% Y5P 50V tub cer	1538-0151-601
C220	68pf 5% GP 50V tub cer	1538-0680-524
C221	.01µf 30% Y5R 25V tub cer	1538-0103-804
C222	.1µf +80-20 BC-12 12V cer disc	1502-0104-006
C223	.1µf +80-20 BC-12 12V cer disc	1502-0104-006
C224	.47pf +8-2 BC-12	1502-0474-006
C225	680pf 10% Y5P 50V tub cer	1538-0681-601
C226	.001µf 10% 100V mylar	1508-0102-610
C227	150pf 10% Y5P 50V tub cer	1538-0151-601
C228	470pf 5% LCQ-17 50V silver mica	1506-0471-550
C229	47µf 20% 10V tant	1515-0470-002
C230	150pf 10% Y5P 50V tub cer	1538-0151-601
C231	.0047µf 10% 100V mylar	1508-0472-610
C232	.005µf +8-2 YZ 50V cer disc	1503-0502-005
C233	.068µf 10% 100V mylar	1508-0683-610
C234	.0047µf 10% 100V mylar	1508-0472-610
C235	.47µf +8-2 BC-12	1502-0474-006
C236	.047µf 10% 100V mylar	1508-0473-610
C237	.0047µf 10% 100V mylar	1508-0472-610
C238	220µf 85D 16V electrolytic	1513-0221-002
C239	.1µf +80-20 BC-12 12V cer disc	1502-0104-006
C240	220µf 85D 16V electrolytic	1513-0221-002
C241	1µf Type U 50V electrolytic	1513-0010-001
C242	33pf 5% NPO 50V tub cer	1538-0330-508

LOCATION	DESCRIPTION	PART NUMBER	
C243	4.7pf 10% NPO 500V cer disc	1500-0479-905	
C244	4.7pf 10% NPO 500V cer disc	1500-0479-905	
C245	.01µf +8-2 YM 50V cer disc	1503-0103-007	
C246	not used		
C247	not used		
C248	.01µf 30% Y5R 25V tub cer	1538-0103-804	
C249	.01µf 30% Y5R 25V tub cer	1538-0103-804	
C250	.001µf 20% Y5T 50V tub cer	1538-0102-703	
DIODES			
CR201A	sil IN4148	4805-1241-200	4 ch
CR201B	sil IN4148	4805-1241-200	4 ch
CR201C	sil IN4148	4805-1241-200	4 ch
CR201D	sil IN4148	4805-1241-200	4 ch
CR202	sil IN4148	4805-1241-200	
CR203	sil IN4148	4805-1241-200	
CR204	sil IN4148	4805-1241-200	
CR205	sil IN4148	4805-1241-200	
TRANSISTORS			
Q201	dual gate FET 3N212	4811-3411-700	
Q202	SPS1476 Blu top	4801-0000-003	
Q203	junct FET 2N5668	4811-0000-030	
Q204	Not used		
Q205	SPS1576 Blu top (blanker sw)	4801-0000-003	
Q206	SPS952	4801-0000-010	
COILS			
L201	5.6µH RF 17N 5R6	1802-0569-008	4 ch
L202	RF yellow	1800-3191-402	
L203	RF yellow	1800-3191-402	
L204	RF yellow	1800-3191-402	
L205	RF orange	1800-3191-412	
L206	22µH RF 17N 222	1802-0220-008	
L207	.27µH TMR	1801-1236-900	
L208	not used		
L209	TOKO	1800-6055-801	
L210	5.6µH RF 17N 5R6	1802-0569-008	
L211	white	1800-3247-201	
INTEGRATED CIRCUITS			
IC201	IF sub system	3130-6056-500	
IC202	TDA 2002AV	3130-5407-602	
IC203	78-L08 8V Reg 10 TO-92	3130-0000-014	

LOCATION	DESCRIPTION	PART NUMBER
CRYSTAL		
Y202	10.245 MHz	2301-3151-601
CERAMIC FILTERS		
CF201	CFU-455D2	2700-3209-500
CRYSTAL FILTERS		
XF201	2P 10.7 MHz	2705-3232-200
XF202	crystal filter	2705-1306-600
XF203	2P 10.7 MHz	2705-3232-200

TRANSMITTER BOARD

LOCATION		DESCRIPTION	PART NUMBER	
RESISTORS		(All resistors are ¼W 5% unless otherwise specified)		
R301		4.7K ohm	4704-0472-032	
R302		2.7K	4704-0272-032	
R303A	A Range	100K ohm	4704-0104-032	4 ch
R303B	A Range	100K ohm	4704-0104-032	4 ch
R303C	A Range	100K ohm	4704-0104-032	4 ch
R303D	A Range	100K ohm	4704-0104-032	4 ch
R303A	B Range	47K ohm	4704-0473-032	
R303B	B Range	47K ohm	4704-0473-032	
R303C	B Range	47K ohm	4704-0473-032	
R303D	B Range	47K ohm	4704-0473-032	
R303A	C Range	47K ohm	4704-0473-032	
R303B	C Range	47K ohm	4704-0473-032	
R303C	C Range	47K ohm	4704-0473-032	
R303D	C Range	47K ohm	4704-0473-032	
R304		47 ohm ½W 10%	4700-0470-044	4 ch
R305		1 ohm 1W	4701-0109-045	
R306		47 ohm ½W 5%	4704-0470-034	
R307		33 ohm ½W 10%	4701-0330-044	
R308		1K ohm	4704-0102-032	
R309		120K	5705-0124-032	
R310	A Range	100 ohm	4704-0101-032	
R310	B Range	100 ohm	4704-0101-032	
R310	C Range	68 ohm	4704-0680-032	
R311		56K	4704-0563-032	
R312		2.2K	4704-0222-032	
R313A		33K ohm	4704-0333-032	
R313B		33K ohm	4704-0333-032	
R313C		33K ohm	4704-0333-032	
R313D		33K ohm	4704-0333-032	
R314		220 ohm	4704-0221-032	
R315		680 ohm	4704-0681-032	
R316		10K variable	4751-0103-002	
R317		10K	4704-0103-032	
R318		15K ohm	4704-0153-032	
R319		2.2K	4704-0222-032	
R320		15K	4704-0153-032	
R321		100K	4704-0104-032	
R322		10K	4704-0103-032	
R323		10K	4704-0103-032	
R324		1.5 meg	4704-0155-032	
R325		470 ohm	4704-0471-032	
R326		4.7K	4704-0472-032	
R327		22K ohm	4704-0223-032	
R328		15K ohm	4704-0153-032	
R329		15K ohm	4704-0153-032	
R330		39K ohm	4704-0393-032	
R331		15K	4704-0153-032	
R332		47K ohm	4704-0473-032	
R333		10K ohm	4704-0103-032	
R334		560K ohm	4704-0564-032	
R335	A Range	10K variable	4751-3407-101	1 ch
R335	B Range	10K variable	4751-3407-101	1 ch
R335	C Range	10K variable	4751-3407-101	1 ch

LOCATION	DESCRIPTION	PART NUMBER
R336 A Range	22K	4704-0223-032
R336 B Range	10K ohm	4704-0103-032
R336 C Range	10K ohm	4704-0103-032
R337	100 ohm	4704-0101-032
R338	4.7K	4704-0472-032
R339	68 ohm	4704-0680-032
R340	100K	4704-0104-032
R341 A Range	100 ohm 10% ½W	4700-0101-044
R341 B Range	100 ohm 10% ½W	4700-0101-044
R341 C Range	22 ohm 1W	4701-0220-045
R342 C Range	2.2K	4704-0222-032

CAPACITORS

C301A	.01µf 30% 25V Y5R tub cer	1538-0103-804	4 ch
C301B	.01µf 30% 25V Y5R tub cer	1538-0103-804	4 ch
C301C	.01µf 30% 25V Y5R tub cer	1538-0103-804	4 ch
C301D	.01µf 30% 25V Y5R tub cer	1538-0103-904	4 ch
C302A A Range	.001µf 20% Y5T 50V tub cer	1538-0102-703	4 ch
C302B A Range	.001µf 20% Y5T 50V tub cer	1538-0102-703	4 ch
C302C A Range	.001µf 20% Y5T 50V tub cer	1538-0102-703	4 ch
C302D A Range	.001µf 20% Y5T 50V tub cer	1538-0102-703	4 ch
C302A B Range	.0022µf 10% 100V mylar	1508-0222-610	4 ch
C302B B Range	.0022µf 10% 100V mylar	1508-0222-610	4 ch
C302C B Range	.001µf 20% 50V tub cer	1538-0102-703	4 ch
C302D B Range	.01µf 30% 25V tub cer	1538-0103-804	4 ch
C302A C Range	.001µf 20% 50V tub cer	1538-0102-703	4 ch
C302B C Range	,001µf 20% 50V tub cer	1538-0102-703	4 ch
C302C C Range	.001µf 20% 50V tub cer	1538-0102-703	4 ch
C302D C Range	.001µf 20% 50V tub cer	1538-0102-703	4 ch
C303	.01µf 30% 25V Y5R tub cer	1538-0103-804	4 ch
C304 A Range	150 pf 50V LCQ17 SM	1506-0151-550	
C304 B Range	100 pf 50V LCQ17 SM	1506-0101-550	
C304 C Range	75pf 50V LCQ SM	1506-0750-550	
C305 A Range	.01µf 30% Y5R 25V tub cer	1538-0103-804	
C305 B Range	.01µf 30% Y5R 25V tub cer	1538-0103-804	
C306	.01µf 30% Y5R 25V tub cer	1538-0103-804	
C307	10µf 25V 85D Type A Elect	1511-0100-003	
C308 A Range	300pf 50V LCQ17 SM	1506-0301-550	
C308 B Range	220pf 50V LCQ17 SM	1506-0221-550	
C308 C Range	150pf 50V LCQ17 SM	1506-0151-550	
C309	22pf 5% 50V NPO	1538-0220-508	
C310 A Range	220pf 50V LCQ17 SM	1506-0221-550	
C310 B Range	100pf 50V LCQ17 SM	1506-0101-550	
C310 C Range	75pf 50V LCQ17 SM	1506-0750-550	
C311 A Range	680pf 50V LCQ17 SM	1506-0681-550	
C311 B Range	360pf 50V LCQ17 SM	1506-0361-550	
C311 C Range	220pf 50V LCQ17 SM	1506-0221-550	
C312	.001µf 20% Y5T 50V tub cer	1538-0102-703	
C313	.01µf 30% 25V Y5R tub cer	1538-0103-804	
C314	.01µf 30% 25V Y5R tub cer	1538-0103-804	
C315	.01µf 30% 25V Y5R tub cer	1538-0103-804	
C316	.005µf +8-2 50V YZ CD	1503-0502-005	
C317	.001µf 20% Y5T 50V tub cer	1538-0102-703	

LOCATION	DESCRIPTION	PART NUMBER	
C318 A Range	300pf 50V LXQ17 SM	1506-0301-550	
C318 B Range	220pf 50V LCQ17 SM	1506-0221-550	
C318 C Range	120pf 50V LCQ17 SM	1506-0121-550	
C319 A Range	300pf 50V LCQ17 SM	1506-0301-550	
C319 B Range	220pf 50V LCQ17 SM	1506-0221-550	
C319 C Range	120pf 50V LCQ17 SM	1506-0121-550	
C320 A Range	10pf 500V NPO CD	1500-0100-905	
C320 B Range	22pf 50V NPO CD	1500-0220-650	
C320 C Range	15pf 10V NPO CD	1500-0150-650	
C321	.01µf 30% Y5R 25V tub cer	1538-0103-804	
C322	47µf 16V 85D Type U Elect	1513-0470-002	
C323 A Range	300pf 50V LCQ17 SM	1506-0470-002	
C323 B Range	220pf 50V LCQ17 SM	1506-0221-550	
C323 C Range	150pf 50V LCQ17 SM	1506-0151-550	
C324 A Range	300pf 50V LCQ17 SM	1506-0151-550	
C324 B Range	220pf 50V LCQ17 SM	1506-0221-550	
C324 C Range	150pf 50V LCQ17 SM	1506-0151-550	
C325	.01µf 30% Y5R 25V tub cer	1538-0103-804	
C326	20pf 5% 50V NPO tub cer	1538-0200-508	
C327A A Range	.39pf 10% Mud	1510-0398-900	4 ch
C327C A Range	2.7pf 500V NPO CD	1500-0279-205	4 ch
C327D A Range	1.2pf 10% Muc	1510-0129-900	4 ch
C327A B Range	.39pf 10% Mud	1510-0398-900	4 ch
C327C B Range	3.9pf 10% 500V NPO CD	1500-0399-905	4 ch
C327D B Range	1.2pf 10% Mud	1510-0398-900	4 ch
C327A C Range	.39pf 10% Mud	1510-0398-900	4 ch
C327C C Range	3.3pf 10% 500V NPO	1500-0339-905	4 ch
C327D C Range	1.2pf 10% Mud	1510-0129-900	4 ch
C328	10µf 16V 85D Type U Elect	1513-0100-002	
C329	47µf 16V 85D Type U Elect	1513-0470-002	
C330	.0022µf 10% 100V Mylar	1508-0222-610	
C331	10µf 16V 85D Type U Elect	1513-0100-002	
C332	.01µf 30% 25V Y5R tub cer	1538-0103-804	
C323 A Range	300pf 50V LCQ17 SM	1506-0301-550	
C323 B Range	250pf 50V LCQ17 SM	1506-0251-550	
C323 C Range	150pf 50V LCQ17 SM	1506-0151-550	
C324	470pf 5% 50V LCQ17 SM	1506-0471-550	
C335 A Range	470pf 5% 50V LCQ17 SM	1506-0471-550	
C335 B Range	470pf 5% 50V LCQ17 SM	1506-0471-550	
C335 C Range	100pf 5% 50V LCQ17 SM	1506-0101-550	
C336A	2.5 - 20pf Trim	1517-0000-034	
C336B	2.5 - 20pf Trim	1517-0000-034	
C336C	2.5 - 20pf Trim	1517-0000-034	
C336D	2.6 - 20pf Trim	1517-0000-034	
C337	.001µf 20% Y5T 50V tub cer	1538-0102-703	
C338	0033µf 10% 100V Mylar	1508-0332-610	
C339 A Range	360pf 50V LCQ17 SM	1506-0361-550	
C339 B Range	250pf 50V LCQ17 SM	1506-0251-550	
C339 C Range	220pf 50V LCQ17 SM	1506-0221-550	
C340	100pf 5% 50V LCQ17 SM	1506-1010-550	
C341 A Range	360pf 50V LCQ17 SM	1506-0361-550	
C341 B Range	470pf 50V LCQ17 SM	1506-0471-550	
C341 C Range	560pf 50V LCQ17 SM	1506-0561-550	
C342	10µf 16V 85D Type U Elect	1513-0100-002	

LOCATION	DESCRIPTION	PART NUMBER	
C343 A Range	300pf 50V LCQ17 SM	1506-0301-550	
C343 B Range	250pf 50V LCQ17 SM	1506-0251-550	
C343 C Range	150pf 50V LCQ17 SM	1506-0151-550	
C344 A Range	300pf 50V LCQ17 SM	1506-0301-550	
C344 B Range	180pf 50V LCQ17 SM	1506-0181-550	
C344 C Range	180pf 50V LCQ17 SM	1506-0181-550	
C345	1µf 50V Type U Elect	1513-0010-001	
C346	.01µf 30% 25V Y5R tub cer	1538-0103-804	
C347A A Range	JU307		
C347B A Range	JU307		
C347C A Range	JU307		
C347D A Range	JU307		
C347A B Range	22pf 500V DM-15 SM	1504-0220-505	
C347B B Range	22pf 500V DM-15 SM	1504-0220-505	
C347C B Range	22pf 500V DM-15 SM	1504-0220-505	
C347D B Range	22pf 500V DM-15 SM	1504-0220-505	
C347A C Range	12pf 500V DM-15 SM	1504-0120-505	
C347B C Range	12pf 500V DM-15 SM	1504-0120-505	
C347C C Range	12pf 500V DM-15 SM	1504-0120-505	
C347D C Range	12pf 500V DM-15 SM	1504-0120-505	
C348	.2µf 12V +8-2 BC12	1502-0204-006	
C349 A Range	33pf 500V DM-15 SM	1504-0330-505	
C349 B Range	not used		
C349 C Range	not used		
C350	.001µf 20% 50V Y5T tub cer	1538-0102-703	

COILS

L301A	3300 uhy 17N332K	1803-3268-212	4 ch
L301B	3300 uhy 17N332K	1803-3268-212	4 ch
L301C	3300 uhy 17N332K	1803-3268-212	4 ch
L301D	3300 uhy 17N332K	1803-3268-212	4 ch
L302A A Range	12 uhy choke	1803-3268-214	
L302B A Range	12 uhy choke	1803-3268-214	
L302C A Range	12 uhy choke	1803-3268-214	
L302D A Range	12 uhy choke	1803-3268-214	
L302A B Range	12 mhy choke	1803-3268-214	
L302B B Range	12 mhy choke	1803-3268-214	
L302C B Range	12 mhy choke	1803-3268-214	
L302D B Range	12 mhy choke	1803-3268-214	
L302A C Range	5.6 uhy choke	1802-0569-008	
L302B C Range	5.6 uhy choke	1802-0569-008	
L302C C Range	5.6 uhy choke	1802-0569-008	
L302D C Range	5.6 uhy choke	1802-0569-008	
L303	3300 uhy 17N332K	1803-3268-212	4 ch
L304	RF variable	1800-3191-404	
L305	RF choke	1800-3189-800	
L306	RF variable	1800-3191-404	
L307	Ferroxcube VK200 19/4B	2502-0000-002	
L308	RF variable	1800-3191-404	
L309	Ferroxcube VK200 19/4B	2502-0000-002	
L310	RF variable	1800-3191-404	
L311	RF variable	1800-3191-404	
L312	RF white	1800-3191-401	

LOCATION		DESCRIPTION	PART NUMBER	
L313A	A Range	choke 3300 uhy	1803-3268-212	1 ch
L313A	B Range	choke 3300 uhy	1803-3268-212	1 ch
L313A	C Range	choke 100 uhy	1802-0101-008	1 ch
L313A	A Range	choke 100 uhy	1802-0101-008	4 ch
L313B	A Range	choke 100 uhy	1802-0101-008	4 ch
L313C	A Range	choke 100 uhy	1802-0101-008	4 ch
L313D	A Range	choke 100 uhy	1802-0101-008	4 ch
L313A	B Range	choke 100 uhy	1802-0101-008	4 ch
L313B	B Range	choke 100 uhy	1802-0101-008	4 ch
L313C	B Range	choke 100 uhy	1802-0101-008	4 ch
L313D	B Range	choke 100 uhy	1802-0101-008	4 ch
L313A	C Range	choke 100 uhy	1802-0101-008	4 ch
L313B	C Range	choke 100 uhy	1802-0101-008	4 ch
L313C	C Range	choke 100 uhy	1802-0101-008	4 ch
L313D	C Range	choke 100 uhy	1802-0101-008	4 ch
L314		RF white	1800-3191-401	
L315A	B Range	choke 22 uhy	1803-3268-217	4 ch
L315B	B Range	choke 22 uhy	1803-3268-217	4 ch
L315C	B Range	choke 22 uhy	1803-3268-217	4 ch
L315D	B Range	choke 22 uhy	1803-3258-217	4 ch
L316				
L317				
L318	C Range	Ferroxcube	2502-0000-002	

DIODES

CR301A	IN4148	4805-1241-200	4 ch
CR301B	IN4148	4805-1241-200	4 ch
CR301C	IN4148	4805-1241-200	4 ch
CR301D	IN4148	4805-1241-200	4 ch
CR302A	Varactor DKV 6533A 10P/4V	4809-1416-200	
CR302B	Varactor DKV 6533A 10P/4V	4809-1416-200	
CR302C	Varactor DKV 6533A 10P/4V	4809-1416-200	
CR302D	Varactor DKV 6533A 10P/4V	4809-1416-200	
CR303	not used		
CR304	not used		
CR305	Sil Rect IN4002	4806-0000-004	

TRANSISTORS

Q301	RF Power	4804-3411-800
Q302	MPS A55	4801-0000-001
Q303	RF Power	4804-3169-605
Q304	not used	
Q305	Blue Top SPS1476	4801-0000-003
Q306	Blue Top SPS1476	4801-0000-003
Q307	Blue Top SPS1476	4801-0000-003
Q308	1N5447	4801-0000-135
Q309	SPS-952-2	4801-0000-016
Q310	SPS-952-2	4801-0000-016
Q311	SPS 952	4801-0000-010

INTEGRATED CIRCUITS

IC301	LM358N	3130-3167-909

CONTROL BOARD

LOCATION	DESCRIPTION	PART NUMBER	
RESISTORS	(All resistors are 5% ¼W unless otherwise noted)		
R401	470 ohm ¼W 10%	4700-0471-042	4 ch
R402	7.5K variable	4750-3406-402	
R403	5K variable	4750-3406-401	
R404	470 ohm ¼W 10%	4700-0471-042	1 ch
R405	not used		
R406	470 ohm ¼W 10%	4700-0471-042	1 ch
R407	470 ohm ¼W 10%	4700-0471-042	1 ch
R408	10K ¼W 10%	4700-0103-042	4 ch
R409	10K ¼W 10%	4700-0103-042	4 ch
R410	10K ¼W 10%	4700-0103-042	4 ch
R411	10K ¼W 10%	4700-0103-042	4 ch
R412	10K ¼W 10%	4700-0103-042	4 ch
R413	10K ¼W 10%	4700-0103-042	4 ch
R414	10K ¼W 10%	4700-0103-042	4 ch
R415	10K ¼W 10%	4700-0103-042	4 ch
CAPACITORS			
C401	.01 30% 25V tub cer	1538-0103-804	1 ch
C402	.01 30% 25V tub cer	1538-0103-804	1 ch
DIODES			
CR401	Led Red	4810-1282-900	4 ch
CR402	Led Red	4810-1282-900	4 ch
CR403	Led Red	4810-1282-900	4 ch
CR404	Led Red	4810-1282-900	4 ch
CR405	Led Red	4810-1282-900	4 ch
CR406	Led Red	4810-1282-900	4 ch
CR407	Led Red	4810-1282-900	4 ch
SWITCHES			
SW401	SW slide	5113-5136-001	1 ch
SW401	Rotary	5111-5411-001	4 ch
SW402	slide option	5113-5136-001	
SW403/R403	switch off/on vol	4750-3415-301	
SW404	slide option	5113-5136-001	

DEVIATION BALANCE BOARD

LOCATION	DESCRIPTION	PART NUMBER
R501A	10K pot	4751-0103-001
R501B	10K pot	4751-0103-001
R501C	10K pot	4751-0103-001
R501D	10K pot	4751-0103-001
CR501A	Diode sil IN4148	4805-1241-200
CR501B	Diode sil IN4148	4805-1241-200
CR501C	Diode sil IN4148	4805-1241-200
CR501D	Diode sil IN4148	4805-1241-200